MHI
Copy 3

FM 4-90

WAR DEPARTMENT

COAST ARTILLERY FIELD MANUAL

SEACOAST ARTILLERY

SERVICE OF THE PIECE

3-INCH RAPID-FIRE GUN (BARBETTE CARRIAGE)

PRESIDIO
ARMY MUSEUM
LIBRARY
The Sixth Army Museum
Ordnance Depot, Bldg. # 13-14
Presidio of San Francisco, Calif.
Property of U. S. Army

FM 4–90

COAST ARTILLERY FIELD MANUAL

SEACOAST ARTILLERY
SERVICE OF THE PIECE
3-INCH RAPID-FIRE GUN (BARBETTE CARRIAGE)

Prepared under direction of the
Chief of Coast Artillery

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1940

For sale by the Superintendent of Documents, Washington, D. C. - Price 10 cents

WAR DEPARTMENT,
WASHINGTON, *May 20, 1940.*

FM 4–90, Coast Artillery Field Manual, Seacoast Artillery, Service of the Piece—3-inch Rapid-Fire Gun (Barbette Carriage) is published for the information and guidance of all concerned.

[A. G. 062.11 (4–16–40).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

E. S. ADAMS,
Major General,
The Adjutant General.

TABLE OF CONTENTS

	Paragraph	Page
SECTION I. GENERAL.		
Scope	1	1
References	2	1
II. ORGANIZATION.		
Gun section	3	1
Gun squad	4	1
Ammunition squad	5	2
Formation	6	2
III. DUTIES OF PERSONNEL.		
Battery executive	7	3
Assistant battery executive	8	3
Chief of section	9	3
Gun pointer	10	6
Range setter	11	6
Chief of breech	12	6
Chief of ammunition	13	7
Ammunition squad	14	8
Artillery mechanics	15	8
IV. NOTES ON THE SERVICE OF THE PIECE.		
General	16	8
The command STAND FAST	17	9
Operation of breechblock	18	9
Service of ammunition	19	9
Loading	20	10
Pointing and firing	21	10
Drill with dummy ammunition	22	10
Action during lulls in firing	23	11
Replacements during extended action	24	11
V. SAFETY PRECAUTIONS.		
General	25	11
The command CEASE FIRING	26	11
Firing mechanism	27	11
Lanyard and firing handle	28	12
Loading	29	12
Unloading	30	12
Cover for gun section	31	12
Poor visibility	32	12
Misfires	33	12
VI. CARE AND ADJUSTMENT OF MATÉRIEL.		
Cleaning	34	13
Care of bore	35	13
Care of breech mechanism	36	14
Breech mechanism, M1903	37	14
Breech mechanism, M1902MI	38	15
Care of carriage	39	16
VII. DRILL TABLE		18
APPENDIX. LIST OF REFERENCES		21

COAST ARTILLERY FIELD MANUAL

SEACOAST ARTILLERY

SERVICE OF THE PIECE

3-INCH RAPID-FIRE GUN (BARBETTE CARRIAGE)

(The matter contained herein supersedes TR 435–276, January 3, 1928.)

SECTION I

GENERAL

■ 1. SCOPE.—*a.* This manual covers the service of the piece for guns, 3-inch (15 pdr.), M1902MI and M1903, on 3-inch (15 pdr. barbette carriage, rapid-fire seacoast artillery. The duties of the members of the gun section in the service of the piece are contained in section III and in the drill table, section VII.

b. The service of the piece prescribed herein is intended as a guide for the battery commander. Changes in the details of the service of the piece may be made to meet local conditions.

■ 2. REFERENCES.—The references listed in the Appendix should be consulted, especially those pertaining to ammunition and to the operation, care, and maintenance of matériel.

SECTION II

ORGANIZATION

■ 3. GUN SECTION.—Each emplacement of one gun is manned by a gun section consisting of a gun squad and an ammunition squad. The war strength of the gun section is 15 enlisted men; the peace strength is 12 enlisted men.

■ 4. GUN SQUAD.—At both peace and war strength, each gun squad (6 enlisted men) consists of a chief of section (gun commander), a gun pointer, a ranger setter, and 3 cannoneers

numbered from 1 to 3, inclusive. Men are assigned to permanent positions according to their aptitude but will be interchanged frequently in drill positions to develop flexibility and to facilitate replacement.

■ 5. AMMUNITION SQUAD.—At peace strength the ammunition squad consists of a chief of ammunition and 5 cannoneers, numbered from 4 to 8, inclusive. At war strength the ammunition squad has 3 additional cannoneers numbered from 9 to 11, inclusive. The squad is divided by its chief into details for the service of ammunition.

■ 6. FORMATION.—Each section assembles in two ranks with 4 inches between files and 40 inches between ranks. The post of the chief of section is in the front rank 1 pace to the right of his section. Artillery mechanics, who are members of the maintenance section, take post in the front rank on the left of the first and last gun sections. (See fig. 1.)

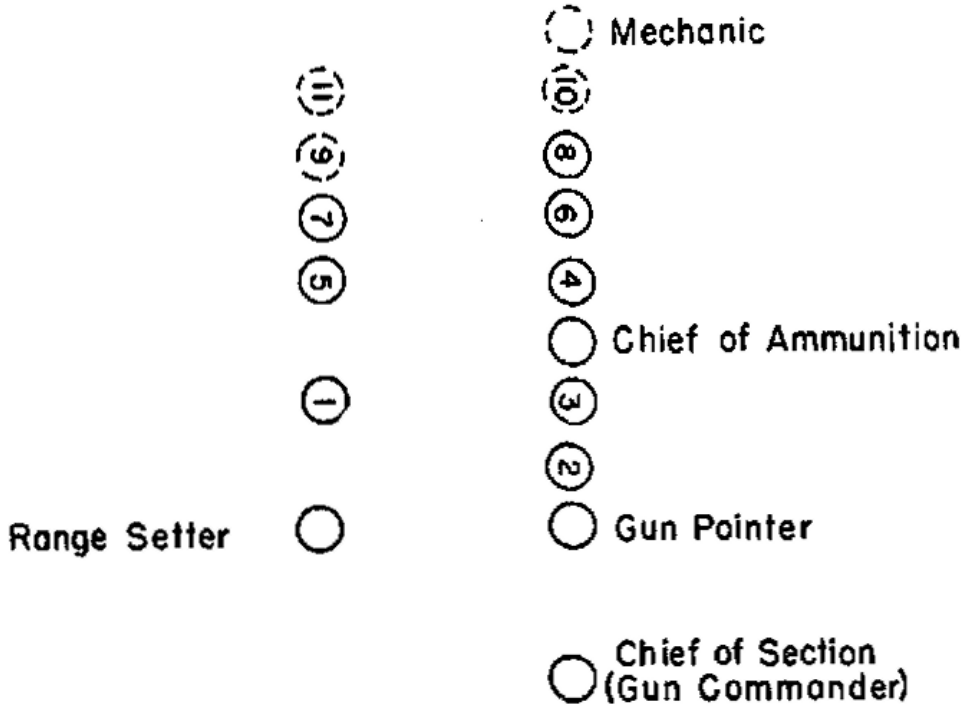

FIGURE 1.—Formation of gun section.

NOTE.—Nos. 9, 10, and 11 are not included in the peace strength organization.

SECTION III

DUTIES OF PERSONNEL

■ 7. BATTERY EXECUTIVE.—*a.* The battery executive commands the firing section of the battery and is in charge of the emplacements. He is responsible to the battery commander for the—

(1) Technical handling of the guns.

(2) Training and efficiency of the personnel of the firing section.

(3) Condition of the matériel under his charge.

(4) Observance of all safety precautions pertaining to the service of the piece.

(5) Police of the emplacements.

b. He supervises the preparation of the guns for firing.

c. He inspects the matériel under his charge and personally verifies the adjustment of all pointing devices as frequently as necessary to insure accuracy. He or the assistant battery executive tests all firing devices before each drill or firing, paying special attention to the safety features.

d. He receives the reports of the assistant battery executive and chiefs of sections and reports to the battery commander, "Sir, firing section in order," or reports defects which he is unable to remedy without delay.

e. If at any time he finds it necessary to hold fire he commands: CEASE FIRING or SUSPEND FIRING, as circumstances indicate, and reports his action to the battery commander.

f. At the conclusion of the drill or firing he commands: REPLACE EQUIPMENT, inspects the emplacements, and reports to the battery commander.

■ 8. ASSISTANT BATTERY EXECUTIVE.—The assistant battery executive performs the duties of the battery executive insofar as they pertain to the emplacement or emplacements to which he is assigned.

■ 9. CHIEF OF SECTION.—*a.* The chief of section (gun commander), a noncommissioned officer, is in command of the gun section and is chief of the gun squad. He is responsible to the officer in charge of the emplacement for the—

(1) Training and efficiency of the personnel of his section.

(2) Condition of the matériel under his charge.

(3) Camouflage discipline and gas discipline at the emplacement.

(4) Firing of the piece.

(5) Observance of all safety precautions pertaining to the service of the piece.

(6) Police of the emplacement.

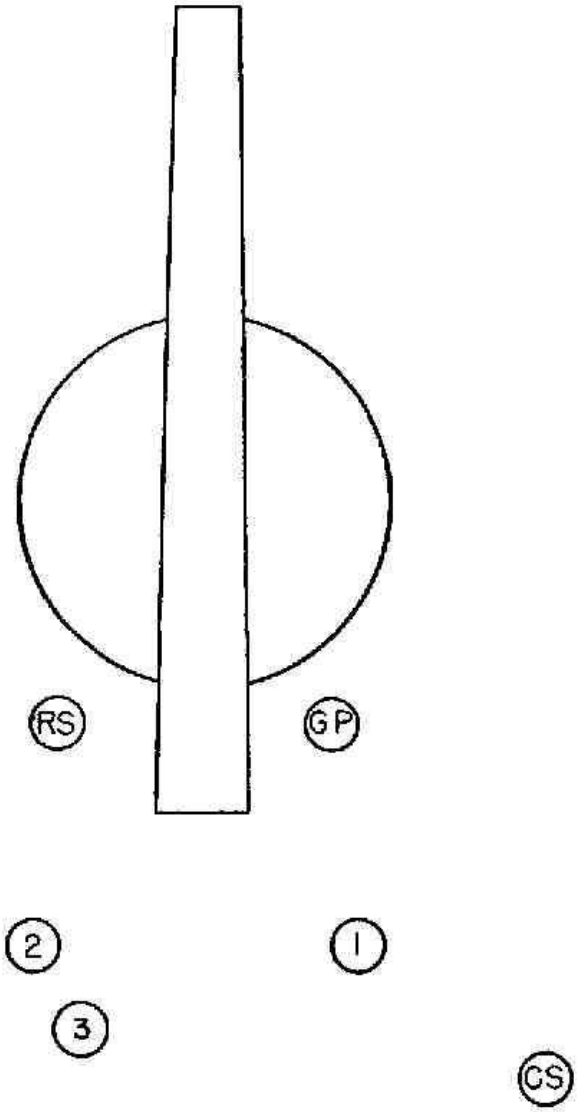

FIGURE 2.—DETAILS, POSTS.

b. He supervises the service of the piece and the supply of ammunition and personally directs the work of care and preservation of the matériel pertaining to the emplacement.

c. He commands: 1 DETAILS, 2. POSTS, when the section arrives in rear of the emplacement and supervises the procurement of equipment. After all details have reached their posts (fig. 2), he commands: EXAMINE GUN. He then makes an inspection of the gun, carriage, and other matériel, paying especial attention to the recoil cylinder, firing mechanism, safety devices, and oiling of the various bearings. He receives the reports of the chief of ammunition and of the various details of the gun squad and reports to the officer in charge of the emplacement, "Sir, No. ——— in order," or reports any defects which he is unable to remedy without delay.

d. When necessary to verify the section, he commands: CALL OFF. The cannoneers of the section call off their titles or numbers in succession, beginning with the unnumbered members of the section, followed by the numbered members in order.

e. He informs the chief of ammunition as to the ammunition to be used.

f. At the command TARGET, he repeats the command and target designation. He assists the gun pointer in locating the target by sighting over the line of metal and directing the traversing of the piece. As soon as the gun pointer is on the target, the gun commander reports or signals to the officer in charge of the emplacement, "Sir, No. ——— on target."

g. At the command COMMENCE FIRING, he commands: LOAD, for the first round only. The piece is fired at the command of the gun pointer as soon as it is ready. Succeeding rounds are loaded and fired without further command from the gun commander but under his supervision. If a limited number of rounds has been specified, the gun commander cautions the loader (No. 2) "——— (so many) rounds only," and commands: SUSPEND FIRING, when that number of rounds has been fired. He then reports to the officer in charge of the emplacement, "Sir, No. ——— (so many) rounds." When the number of rounds has not been specified (the normal case), the gun commander repeats the command SUSPEND FIRING or CEASE FIRING when received, and reports the number of rounds fired. He supervises the work of unloading if the piece is loaded or if dummy ammunition is being used.

h. At the command REST, he repeats the command and allows the members of the section to leave their posts but not the immediate vicinity of the emplacement.

i. During firing, he carefully observes the action of the piece in recoil and counterrecoil with particular attention to its full return to battery after each shot.

j. In case of a misfire he calls "No. ——— misfire." He sees that the precautions described in paragraph 33 are observed.

k. At the command REPLACE EQUIPMENT, he repeats the command and supervises the securing of the piece and the replacing of equipment. If the piece has been fired, he supervises the cleaning of the bore; the dismantling, cleaning, and proper assembling after cleaning of the breechblock and firing mechanism; and the proper and sufficient oiling of all bright parts and bearing surfaces. He sees that the emplacement is policed and then unless otherwise directed forms his section.

l. He keeps a record of the number of rounds fired by his gun during a practice or action, showing the date, approximate time, and any unusual action of the ammunition.

■ 10. GUN POINTER.—The gun pointer (noncommissioned officer) is charged with the duty of laying the piece in direction. In case I firing, he points the piece in direction and elevation. He is responsible to the gun commander for the proper operation, care, and adjustment of the sight, the traversing mechanism, and the firing mechanism. When the firing handle is used he fires the piece. For detailed duties of the gun pointer, see drill table, section VII.

■ 11. RANGE SETTER.—The range setter (noncommissioned officer) is charged with the duty of laying the piece in range, except in firing by case I when the piece is pointed in elevation and direction by the gun pointer. The range setter is responsible to the gun commander for the proper operation, care, and adjustment of the elevating mechanism. For detailed duties of the range setter, see drill table, section VII.

■ 12. CHIEF OF BREECH.—The chief of breech (No. 1) is responsible to the gun commander for the proper care and operation of the breech mechanism, the condition and serviceability of the lanyards, and when firing by lanyard, the

firing of the piece. He is also responsible for the efficiency of the breech detail and that spare lanyards are available. When the firing handle is being used he is prepared to shift to firing by lanyard, if necessary. For detailed duties of the chief of breech see drill table, section VII.

13. CHIEF OF AMMUNITION.—*a.* The chief of ammunition (noncommissioned officer) is responsible to the chief of section for the—

(1) Efficiency of the personnel under his charge.

(2) Care and preservation of the ammunition and the magazines.

(3) Correct recording of ammunition data.

(4) Observance of all safety precautions in the care and service of ammunition.

(5) Protection of the ammunition against water, dampness, fire, and the direct rays of the sun.

(6) Police of the magazines.

(7) Uninterrupted service of ammunition during action.

b. He keeps a record of all ammunition received and that used by his gun, exercising particular care that ammunition is listed under proper type.

c. He keeps the chief of section informed regarding ammunition on hand and reports defects found.

d. He keeps a thermometer in each magazine, where required.

e. At the command DETAILS, POSTS, he opens the magazines and posts the members of his squad.

f. At the command EXAMINE GUN, he inspects the ammunition and gives the necessary instructions for preparing ammunition for service or drill. He then reports to the chief of section, "Ammunition service in order," or any defects that he is unable to remedy without delay.

g. At the command TARGET, he starts the delivery of ammunition to the gun. He sees that a sufficient supply of ammunition is maintained at the gun to sustain the maximum rate of fire.

h. At the command REPLACE EQUIPMENT, he sees that unused ammunition is repacked in ammunition boxes, and that these boxes are marked with the number of rounds contained and the proper lot number. He sees that empty cartridge

cases are packed and disposed of as directed. He sees that the magazines are policed and locked. If dummy ammunition is used, he supervises the cleaning and storing of the dummy rounds. He forms his squad and reports to the chief of section.

■ 14. AMMUNITION SQUAD.—The ammunition squad is charged with the opening of ammunition cases and the preparation of ammunition for firing, with carrying the ammunition to the guns, and with returning empty cartridge cases to the magazines. It is responsible for the police of magazines and corridors and for the disposal of empty cartridge cases. It is divided into details by the chief of ammunition so as to insure the most effective performance of its duties considering the location of the magazines.

■ 15. ARTILLERY MECHANICS.—The artillery mechanics, assisted by members of the gun sections, make such minor repairs and adjustments as can be made with the means available. The chief artillery mechanic is the custodian of the supplies pertaining to the emplacements to which his battery is assigned. He is responsible for the condition of the supply rooms at the emplacements and the supplies contained therein. The chief mechanic or his assistant issues such equipment, tools, oils, paints, and cleaning materials to the members of the gun sections as may be necessary for the service and care of the guns and accessories.

SECTION IV

NOTES ON THE SERVICE OF THE PIECE

■ 16. GENERAL.—The service of the piece will be conducted with dispatch and precision and with as few orders as possible. Commands will be given in the prescribed form. Signals may be substituted for commands whenever practicable. Except for the necessary orders, reports, and instructions, no talking will be permitted. Cannoneers change positions at a run. Loading with dummy ammunition and pointing the piece as for actual firing is the normal practice at drill.

17. THE COMMAND STAND FAST.—If it is desired to halt all movements of matériel and personnel, the officer in charge of the emplacement or the chief of section commands: STAND FAST.

18. OPERATION OF BREECHBLOCK.—*a.* No. 1 should operate the breechblock with as little jar as possible and always in a uniform, steady manner.

b. When manning the M1902MI gun, No. 1 should be thoroughly drilled to feel for the firing pin each time he opens the breech in order to make certain that the firing mechanism has returned to the cocked position. (See par. 27 c.)

19. SERVICE OF AMMUNITION.—*a.* For peacetime firings all cartridges will be tried in the chamber before they are used. Those which do not fit accurately will be rejected.

b. If a cartridge jams, no attempt will be made to drive it home by forcing the block; it will be withdrawn and another substituted.

c. If a cartridge case is extracted with difficulty, the cause may be a bur around the edge of the chamber; if one is found, it should be filed smooth.

d. When using ammunition equipped with the M48 fuze the setting "superquick" will normally be used. This fuze setting is indicated by the screw driver slot in the fuze being turned toward SQ. Before serving ammunition to the gun, this setting is checked by a member of the ammunition squad designated by the chief of ammunition. If for any reason it is desired to set the fuze for delay, the screw driver slot is turned until it points toward "delay."

e. For delivery of ammunition to No. 2, the following procedure is suggested: Members of the ammunition squad bring or pass up the ammunition to the left side of the gun, keeping well out of the way of the gun squad. They pass rounds to No. 2 in the most expeditious manner and in such a way that he is able to grasp the base of the cartridge case with his right hand. Ammunition servers must coordinate their actions to those of No. 2.

f. When a round is unloaded from the gun, it should be examined to see if the projectile is securely attached in the case.

■ 20. LOADING.—To receive the round, No. 2 steps with his left foot toward the ammunition server and grasps the round with his right hand at the base of the cartridge case and his left hand in rear of the ogive. He then resumes his position facing the breech, inserts the nose of the projectile in the breech, and removes his left hand. When about one-third of the cartridge case still extends beyond the breech face, he gives the round a final push until his open hand comes in contact with the breech, then, continuing the motion, he rotates his hand upward and to the left. No. 2 will hold the next round to be loaded well out of the path of recoil until the gun is back in battery. Smooth, steady loading by No. 2 will do more to assist the gun pointer to get his shots off rapidly than any other one factor in the service of the piece.

■ 21. POINTING AND FIRING.—The range setter keeps the piece laid continuously in range. If the lanyard is used, the gun pointer commands: FIRE, as soon after No. 1 has called "Ready" as the piece is pointed. No. 1 fires the piece. When the firing handle is used, the gun pointer fires the piece.

■ 22. DRILL WITH DUMMY AMMUNITION.—*a.* For simulated fire using dummy ammunition, the following procedure is recommended:

(1) The piece is pointed in the same manner as for firing.

(2) Three dummy rounds are used. Nos. 2, 3, and a member of the ammunition squad take posts, Nos. 2 and 3 at their regular positions and the ammunition server to the left of No. 2. Each man holds a dummy round.

(3) At the command COMMENCE FIRING, the process of loading and firing is carried out as with service ammunition. The three dummy rounds are loaded, unloaded, and circulated in as close an approximation of service firing conditions as possible.

b. Unusual events, such as misfires, which may occur during actual firing will be simulated during the drill. They should be called by the officer in charge, without prior information to the gun squad, and in such a manner as to inject realism into the drill.

■ 23. ACTION DURING LULLS IN FIRING.—When there is a lull in the firing or drill, each member of the gun section will inspect, clean, and place in the best possible condition the matériel under his charge.

■ 24. REPLACEMENTS DURING EXTENDED ACTION.—The shock effect of these guns may materially lower the efficiency of the gun pointer and range setter during an extended action. For this reason it is well to have capable replacements for these men. These replacements should be members of the ammunition squad who were assigned work in the magazines or in some other place not directly exposed to concussion.

SECTION V

SAFETY PRECAUTIONS

■ 25. GENERAL.—*a.* The following safety precautions are prescribed for peacetime conditions. They indicate, as well, the general principles to be followed in war service conditions.

b. Further instructions concerning safety precautions will be found in AR 750–10 and FM 4–20.

■ 26. THE COMMAND CEASE FIRING.—*a.* Any individual in the military service will command or signal CEASE FIRING if he observes any condition which makes it unsafe to fire.

b. At the command CEASE FIRING, given when the piece is loaded, the firing handle will be released or, if firing by lanyard, the lanyard will be detached.

■ 27. FIRING MECHANISM.—*a.* The firing mechanism will be inspected and tested frequently, and immediately before firing, to insure proper operation and functioning of the safety features.

b. To test the proper functioning of the safety features of the mechanism, a strong pull will be exerted on the lanyard or firing lever while the breechblock is being closed to ascertain if it is possible for the firing mechanism to function before the breech is closed and locked.

c. When firing the M1902MI gun, if the firing mechanism fails to return to the cocked position, there is great danger that the protruding firing pin will fire the primer in the cartridge base when the breechblock is thrown to the closed

position. It is important that the breechblock be checked for a protruding firing pin each time it is opened during drill or firing. With M1903 guns, this danger is guarded against; however, frequent inspection should be made to see that the point of the firing pin has not been broken or jammed in any way.

■ 28. LANYARD AND FIRING HANDLE.—The lanyard or firing handle should be pulled with a quick, strong pull (not a jerk).

■ 29. LOADING.—No. 2 will hold the next round to be loaded well out of the path of recoil until the gun is back in battery.

■ 30. UNLOADING.—When the command UNLOAD is given, No. 1 opens the breech, and No. 2 standing close to the breech receives the ejected round with both hands. In case the extractor fails to eject the round the hand extractor should be used. If the round cannot be readily extracted from the gun it should be fired, safety precautions permitting. If the round cannot be fired or if the projectile becomes sufficiently separated from the cartridge case so that the breechblock cannot be closed, the round should be removed *under the direct supervision of an officer* using the method prescribed in *TM 9–905.

■ 31. COVER FOR GUN SECTION.—*a.* When firing high explosive ammunition and cover is prescribed, each member of the gun section will be required to take adequate shelter each time the piece is fired. (See AR 750–10.)

b. No cover is required when firing shell equipped with the M48 fuze.

■ 32. POOR VISIBILITY.—During target practice, firing will be stopped at once if visibility becomes so poor as to endanger the tug or shipping in the field of fire.

■ 33. MISFIRES.—In case of a misfire, at least two additional attempts to fire the piece will be made. The breechblock will not be opened until at least 2 minutes have elapsed after the last unsuccessful attempt to fire the piece. The gun will be kept directed in elevation and azimuth either on the target or

*See Appendix.

on a safe place in the field of fire, and all persons will remain clear of the path of recoil. Rounds which have misfired will be removed from the emplacement and disposed of as prescribed in *TM 9–905.

SECTION VI

CARE AND ADJUSTMENT OF MATÉRIEL

34. CLEANING.—Dirt and grit accumulated from the blast of the piece in firing settle on the bearing surfaces and in combination with the lubricant form a cutting compound. Powder fouling attracts moisture and hastens the formation of rust. Therefore, during lulls in firing and immediately after firing, the piece must be thoroughly cleaned. At other times it should be cleaned at intervals depending upon its use and condition. Dirt on nonbearing surfaces can usually be removed by water; lubricated or greasy parts must be cleaned with dry-cleaning solvent applied with a rag.

35. CARE OF BORE.—*a.* As soon as possible after any period of firing, the bore of the gun will be cleaned to remove all powder residue and then thoroughly oiled. The cleaning solution is made by dissolving from ½ to 1 pound (depending on the strength desired) of soda ash in each gallon of boiling water. The bore is washed with this solution using a swab of burlap stitched around the end of the rammer staff. When all powder fouling has been removed, the bore is swabbed with clear, hot water, wiped dry with a swab of new, dry burlap, and then oiled.

b. Although after one cleaning all powder fouling may appear to have been removed, daily inspections will show that such is not the case. For this reason the cleaning procedure is repeated daily until all evidence of sweating disappears. Between these daily cleanings, the bore is coated with light lubricating oil, as rust-preventive compound may conceal evidence of corrosion and will make daily cleanings more difficult. After the final cleaning, the bore is coated with medium or heavy rust-preventive compound, depending on local conditions.

---

*See Appendix.

■ 36. CARE OF BREECH MECHANISM.—As soon as possible after firing, the breechblock and firing mechanism should be disassembled (par. 37 or 38) and all parts cleaned with the same kind of solution used in cleaning the bore. The parts should then be thoroughly dried, lightly oiled, and reassembled.

■ 37. BREECH MECHANISM, M1903.—No tools are required to disassemble or assemble this mechanism.

a. Firing mechanism.—(1) *To disassemble.*—Take hold of the ends of the trigger shaft detent under the trigger shaft bearing and press them together. At the same time push the trigger shaft to the left, removing it from its seat. Take hold of the knurled-headed end of the firing case and revolve it to the left until it stops, then pull it gently to the rear. This will remove the case with the firing mechanism complete from the gun. Gently press on the front end of the firing pin, forcing it back into the case. This will allow the cocking lever to be taken out. Grasp the front end of the firing spring follower and revolve it sufficiently to disengage the sear, after which it can be removed from the case. Press the end of the firing spring follower and revolve it sufficiently to disengage the projecting pin on the follower from the firing pin. The follower and spring can then be disassembled. Turning the firing case in the hand will allow the sear and spring to fall out of its seat.

(2) *To assemble.*—Place the sear with spring in its seat in the case, assemble the firing pin, spring, and follower. Insert them into the case, holding the case in such a manner that the sear will not fall out of its place. Hold the firing pin tight against the sear and through the opening in the side of the case insert the cocking lever arm, which has a small notch for the purpose of engaging the lug on the sear. Pull the sear down on its spring and the firing pin will pass over it. Turn the firing pin so that the cocking lever can be inserted in its seat, being careful to note that the circular face engages the firing spring follower. Press the cocking lever tightly into its seat. The initial tension on the firing spring will hold it in place unless the firing pin is pressed back to release it. Insert the case into its seat in the block carrier and revolve it to the right until it stops; then insert the trigger shaft in its bearing and engage the detent.

b. Breechblock mechanism.—(1) *To disassemble.*—Grasp the operating lever and open the mechanism. When the mechanism is open, force the block latch out of its seat in the breechblock flange, revolve the breechblock to the right until it stops, remove the trigger shaft and firing mechanism, then pull the breechblock from the hub of the carrier, taking care not to drop it. The block latch can now be easily removed. Take hold of the carrier and operating lever and pull out the hinge pin. Slide the operating bar out of its seat; remove the extractor from its recess.

(2) *To assemble.*—Reverse the operations in (1) above, being careful not to assemble the firing (mechanism) case until the breechblock is in place on the carrier.

■ 38. BREECH MECHANISM, M1902MI.—No tools are required to disassemble or assemble this mechanism.

a. Firing mechanism.—(1) *To disassemble.*—Take hold of the trigger shaft detent, pulling it out, at the same time pushing the trigger shaft to the left, removing it from its seat. Take hold of the knurled-headed end of the firing case and revolve it to the left until it stops, then pull it gently to the rear. This will remove the case with the firing mechanism complete from the gun. Then gently press on the front end of the firing pin, forcing it back into the case. This will allow the cocking lever to be taken out. Then grasp the front end of the firing pin and turn it sufficiently to disengage the sear, after which it can be removed from the case. Press the end of the firing spring follower and revolve it sufficiently to disengage the projecting pin on the follower from the firing pin. The follower and spring can then be disassembled. Turning the firing case in the hand will allow the sear and spring to fall out of its seat.

(2) *To assemble.*—Place the sear with spring in its seat in the case, assemble the firing pin, spring, and follower. Insert them into the case, holding the case in such a manner that the sear will not fall out of its place. Hold the firing pin tight against the sear and through the opening in the side of the case insert the cocking lever arm, which has a small notch for the purpose of engaging the lug on the sear. Pull the sear down on its spring and the firing pin will pass over it. Turn the firing pin so that the cocking lever can be inserted

in its seat, being careful to note that the circular face engages the firing spring follower. Press the cocking lever tightly into its seat. The initial tension on the firing spring will hold it in place unless the firing pin is pressed back to release it. Insert the case into its seat in the block carrier and revolve it to the right until it stops; then insert the trigger shaft in its bearing and insert the detent.

b. Breechblock mechanism.—(1) *To disassemble.*—Grasp the operating lever and open the mechanism. When the mechanism is open, force the block latch out of its seat in the breechblock flange, revolve the breechblock to the right until it stops, remove the trigger shaft and firing mechanism, then pull the breechblock from the hub of the carrier, taking care not to drop it. The block latch can now be easily removed. Take hold of the carrier and operating lever and pull out the hinge pin. Slide the operating bar out of its seat; remove the extractor from its recess.

(2) *To assemble.*—Reverse the operations in (1) above, being careful not to assemble the firing case until the breechblock is in place on the carrier.

■ 39. CARE OF CARRIAGE.—*a.* Carriages should be traversed and elevated at least twice a month throughout their entire allowable movement. When the carriage is to be kept in readiness for service, all bearing parts must be kept thoroughly cleaned and lubricated. This lubrication should include the teeth of gears, as well as all oil holes. When carriages are in use daily, a thorough lubrication twice each week should be sufficient for all but the most severely used parts.

b. The ring of pivot yoke bearings should be removed frequently for the purpose of cleaning by removing the nut supporting it with the spanner wrench provided. In this way any grit reaching the bearing from the top of the pedestal can be removed.

c. When the piece is not in use, the breech and muzzle covers and the tarpaulin should be kept in position.

d. (1) To fill the recoil cylinder, remove the rear filling plug and bring the gun to maximum depression. Fill the cylinder to overflowing by means of the funnel provided, and then take out from ¼ pint to ½ pint of oil. The cylinder holds 3.2 quarts of oil and can be filled in about 5 minutes.

(2) To drain the recoil cylinder, remove the emptying plug and catch the oil by means of a funnel placed near the opening. The oil will run out more rapidly if the filling plug is partially removed.

e. Oil holes must be cleaned frequently to keep them free from sand, grit, and dirt. They must be kept closed with the screw plugs or countersunk screws provided. Before oiling, wipe off carefully all dirt or grit near the opening that might be carried down into the bearing. All oil plugs, screws, covers, and grease cups should be painted red in order that they may be readily located. Fittings which cannot be painted should have a red ring painted around them.

f. If rust should accumulate, its removal from all bearing surfaces, especially piston rods and breech threads, requires particular attention in order that clearances shall not be unduly increased. Abrasives will be used as prescribed in *TM 9–850. Rust may be softened with dry-cleaning solvent.

*See Appendix.

SECTION VII

DRILL TABLE

Service of the piece, 3-inch rapid-fire gun (Barbette carriage)

Details	DETAILS, POSTS	(*a*) EXAMINE GUN (*b*) REPORT	TARGET	LOAD	CEASE FIRING
Gun pointer...	Gets sight, places it in its seat, and takes post in rear of shoulder piece, facing to front.	(*a*) Examines sight, traversing mechanism, and firing handle mechanism. Puts on telephone head set and tests communication. (*b*) Reports to gun commander, "Traversing in order," or any defects he is unable to remedy without delay.	Takes and reports travel of target, sets deflection ordered, and tracks target.	Changes deflection as ordered, follows target continuously, and fires piece or commands: FIRE, as soon after No. 1 calls "Ready" as the piece is pointed.	Continues to track target until command CEASE TRACKING is given.
Range setter...	Takes post near range scale, facing it.	(*a*) Tests elevating mechanism and cleans and oils gears; puts on telephone head set and tests communication. (*b*) Reports to gun commander "Elevation in order," or any defects he is unable to remedy without delay.	Lays piece in range.	Keeps piece laid continuously in range in accordance with transmitted data.	Continues to lay piece in range until command CEASE TRACKING is given.

No. 1 (chief of breech).	Gets cotton waste, can of lubricating oil, and sponge; places can convenient to breech and takes post about 2 feet to rear and *right* of breech, facing it.	(*a*) Removes breech cover and places it at designated place; examines chamber, bore, breechblock threads, and breech mechanism and cleans and oils them if necessary, assisted by Nos. 2 and 3. (*b*) Reports to gun commander "Breech in order," or any defects he is unable to remedy without delay.	Hooks lanyard.....	Opens breech, closes it as soon as cartridge is inserted, and calls "Ready." If there is any difficulty in opening or closing breech, wipes any residue from threads of breechblock and oils mechanism. When the lanyard is used, fires piece at command of gun pointer.	Opens breech. After cartridge has been removed, cleans and oils breechblock and closes breech.
No. 2 (breech detail).	Gets cotton waste, sponge, and lanyard (if used); takes post about 2 feet to rear and *left* of breech, facing it.	(*a*) Removes muzzle cover and places it at designated place, examines lanyard; examines, cleans, and oils breech recess. (*b*) No duties.	Hands lanyard to No. 1.	Receives cartridge from member of ammunition squad and inserts it in chamber, taking care that point of projectile does not strike breech. If there is any difficulty in opening or closing breech, wipes any residue from threads of breech recess and oils threads if they become dry.	Cleans and oils breech recess.

DRILL TABLE—Continued

Service of the piece, 3-inch rapid-fire gun (Barbette carriage) —Continued.

Details	DETAILS, POSTS	(*a*) EXAMINE GUN (*b*) REPORT	TARGET	LOAD	CEASE FIRING
No. 3	Gets hand extractor and a pair of asbestos gloves; takes post about 3 feet to rear and 1 foot to left of breech, facing it.	(*a*) Removes recoil cylinder filling plug. If cylinder is not full, gets measure of recoil oil and funnel; fills cylinder (see par. 39 *e*); and after inspection by gun commander replaces filling plug, oil measure, and funnel. (*b*) No duties.	Puts on gloves	Receives empty cartridge case as it is ejected and lays it aside, uses hand extractor when necessary.	Withdraws cartridge.

APPENDIX

LIST OF REFERENCES

Ammunition, general	TM 9–905 (now published as TR 1370–A).
Camouflage, cover, protection against air and chemical attacks, local security, machine gun defense	FM 4–5.
Care and maintenance of matériel	TM 9–850 (now published as TR 1395–A). FM 4–20.
Coast artillery ammunition	TM 4–205.
Coast artillery weapons and matériel	TM 4–210.
Commands	FM 4–5.
Drill ammunition	TM 9–905 (now published as TR 1370–D).
Examination for gunners	FM 4–150.
Fire control and position finding	FM 4–15.
Firing tables:	
Shell, fixed, H. E.—	
M42, fuze, P. D., M48	FT 3–Q–1.
M1915; also Mk. VII shell and shot	FT 3–M–2.
Mk. I	FT 3–P–1.
Matériel, gun M1902MI on carriage M1902	Ordnance Document No. 1766, including addendum.
Matériel, gun F1903	Ordnance Document Document No. 1772.
Organization of the battery	T/O 4–67. FM 4–5.
Safety precautions in firing	AR 750–10. FM 4–20.